

May 11, 1965

H. J. SEARER

3,182,841

SNAP-ON LID FOR BABY FOOD CONTAINERS

Filed Oct. 1, 1962

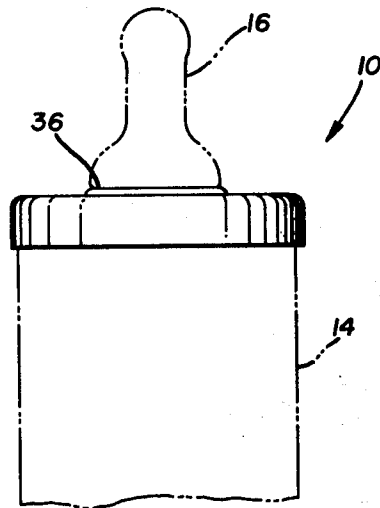


FIG. 1

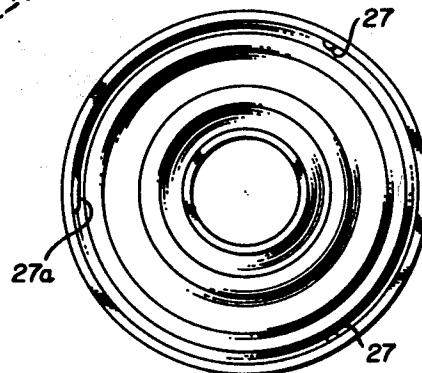


FIG. 3

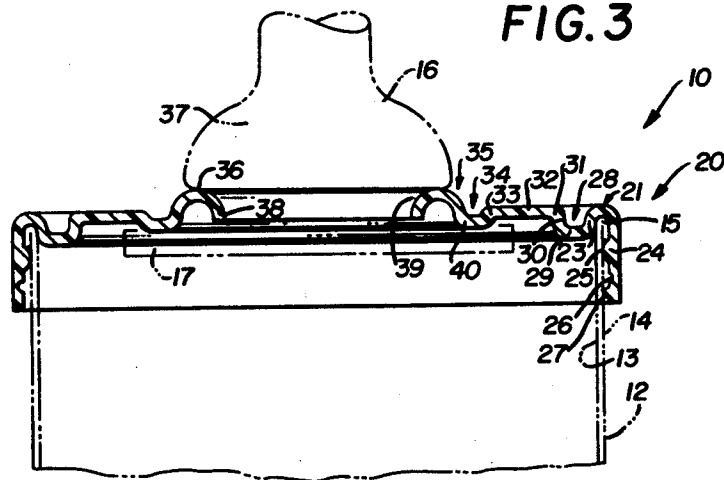


FIG. 2

INVENTOR  
HAROLD J. SEARER  
BY *Hamilton & Cook*  
ATTORNEYS

1

3,182,841

**SNAP-ON LID FOR BABY FOOD CONTAINERS**  
Harold J. Searer, Akron, Ohio, assignor to Pet Milk Company, St. Louis, Mo., a corporation of Delaware  
Filed Oct. 1, 1962, Ser. No. 227,398  
5 Claims. (Cl. 215-11)

The present invention relates to an improved nursing article for use the feeding of edible fluids or liquids to infants. More particularly, the invention relates to an improved combination of container, nursing nipple, and snap-on lid. Specifically, the invention relates to a thermoplastic snap-on lid adapted to provide a liquid-tight seal between lid and container, and lid and inserted nipple.

Heretofore, baby food containers have been emptied into separate baby bottles or other articles designed for infant feeding. These bottles have required relatively expensive lids in order that they might be sterilized and reused. Also, the preparation of formula and the filling of the bottles has been somewhat inconvenient during travel and in other instances.

Baby food manufacturers market premixed formula and other baby food for sale in stores and pharmacies. These products would be more marketable if packaged in a suitable sterilized nursing article, or if the package or container could be adapted for direct use with a nipple. However, the cost of the container, lid and nipple must not create a significant increase in the price of the product. Thus, presently employed threaded and gasketed constructions would prove unsuitable because of the extra expense incurred in manufacturing and packaging. In addition, certain other disadvantages have been present in nursing bottle lids previously employed.

Accordingly, it is an object of the present invention to provide an improved, inexpensive combination nursing article for infant feeding.

It is a further object of the invention to provide an improved snap-on lid providing liquid-tight seals between lid and container, and lid and inserted nipple.

It is an even further object of the invention to provide a molded thermoplastic lid for baby food containers which may be sterilized without deformation.

It is a still further object of the present invention to provide an improved snap-on lid adapted for use with either disposable or refillable baby food containers.

It is a still further object of the present invention to provide an improved snap-on lid for baby food containers providing selective loose or liquid-tight fits with the container.

Other objects and advantages of the invention will become apparent from the following description and the drawing.

In the attached drawing:

FIG. 1 is a side view showing a baby food container and nursing nipple (in chain lines) and an improved snap-on lid according to the invention.

FIG. 2 is an enlarged longitudinal sectional view taken in a plane parallel to the axis of the container top and illustrating details of the improved lid.

FIG. 3 is a bottom plan view of the lid illustrating further details.

In the drawing, the combination of container, nipple and snap-on lid is indicated generally by the numeral 10.

The container has an inner surface 13 and an outer surface 14 terminating at the top of the container in a circumferential lip 15. The container may be made of any suitable material, including glass, plastic, metal or paper, permitting the top of the container to be formed with the circumferential lip. Further, though shown as cylindrical, the container or the opening in the container

2

top, may have shapes other than circular such as square, rectangular, hexagonal or triangular.

The nursing nipple 16 may be of any suitable type having a relatively thick, radially outwardly extending circumferential flange 17. A particularly suitable nipple shown in the inventor's U.S. Patent No. 2,513,896.

The snap-on lid 20 has a circumferential flange 21, defined by an inner skirt 23 and an outer skirt 24, for attachment to and fluid-tight engagement with the container lip 15 and adjacent surfaces 13 and 14.

The inner face of the outer skirt 24 of the lid flange has a radially inwardly directed, rounded circumferential locking bead 25 for securely engaging the outer container surface 14 below the container lip 15.

Below the locking bead 25, the inner face of the flange skirt 24 is formed with one or more radially outwardly directed indent rings 26. The purpose of the indent rings 26 is explained below.

Below the indent rings 26, the inner face of the flange skirt 24 has a series of radially inwardly directed protuberances or hemispherical catch bubbles 27. As shown in FIG. 3, there may be three bubbles 27 equally spaced 120° apart. The purpose of the catch bubbles is explained below.

Radially inwardly of the flange 21, the lid 20 preferably has at least two circular recessed portions which permit momentary deformation of the lid for attachment to the container 12 and provide resiliency of structure for maintaining the lid on the container after attachment.

As shown, there is a radially outer circular nave or recessed portion indicated generally at 28. The recessed portion 28 is defined by the radially inner wall of flange skirt 24, a horizontal portion 29 and a vertical wall portion 30. Extending radially inwardly from the inner wall 30, from a shoulder indicated at 31, is a flat medial portion 32. An inner shoulder indicated at 33, the flat portion 32 intersects the curved outer wall of a second or inner circular recessed portion indicated generally at 34. The inner recessed portion 34 is shallower in depth than the outer recessed portion 28, and also serves to seat and seal the upper surface of the nipple flange 17.

Extending axially upward and radially inward from the inner recessed portion 34, the lid 20 has a curled hook flange portion indicated generally at 35, for retaining the nipple 16 in communication with the interior of container 12 when the top thereof is opened. The flange portion 35 includes a crown surface 36 for seating the breast portion 37 of a nipple 16. The radially innermost edge 38 of the flange portion 35, which defines a circular opening in the lid, provides a guide seat for the outwardly directed neck portion 39 of the nipple 16, extending between the nipple flange 17 and breast portion 37.

When the nipple 16 is manually inserted within the opening in the lid 20, the axial distance between the upper surface (40) of the inner lid recessed portion 34 and the crown surface 36 is such that the nipple neck portion is uniformly distended and slightly stretched providing a tight fluid seal.

Although the novel snap-on lid may be composed of any suitable material, it is preferably made of thermoplastic. More specifically the lid may be made of high density polyethylene (e.g., specific gravity 0.941-0.96) which is compression molded or injection molded in shape, the former technique being preferred.

This material possesses many useful properties which provide improved results in this application. High density polyethylene is relatively strong, but yet resilient. It is relatively hard, but not brittle. Therefore, it is ideally suited for the novel snap-on lid 20.

The properties of resilience are utilized to provide a liquid-tight seal between the lid and container without requiring gasketing or thread and screw means. The

struction is made possible which alleviates problems of shrinkage which arise during repeated use of gasketed, downward lids. Moreover, the snap-on construction provides additional recesses in which germs or bacteria can accumulate. A third, and highly important, advantage lies in the fact that the snap-on lid is less expensive to produce than former types due to the use of inexpensive material and simple molding techniques. The hardness of the material provides the desirable advantages of resistance to distortion, scratching, or degradation; while, at the same time, the material is not as brittle as are thermosetting plastic lids of the type formerly known (e.g., Bakelite). Therefore, the snap-on lid 20 is not subject to cracking and germs and bacteria will not multiply in the crevices.

Other useful properties include resistance to corrosion, discoloration, or attack by weak acids and alkalis. The latter property renders the lid unaffected by weak acids and alkalis (e.g., citric acid, acetic acid, etc.) which are present in baby foods and formula. Thus, the lid material will not contaminate the baby food. Other important properties of high density polyethylene pertain to its heat characteristics. It has a relatively high resistance to continuous heat. Hence, the snap-on lids can be sterilized, by boiling or steaming in an autoclave or some sterilizer, without deleterious effects to the plastic. The material also has excellent resistance to cold temperatures so that the lid may be stored, in place on the container, in coolers or refrigerators.

Referring now to the heat characteristics, although the material displays a high heat resistance index, certain problems have prevented use of this or similar materials in liquid-tight snap-on lid which requires sterilization at high temperature (212° F.).

During heating from normal room temperature to about 140–180° F., the coefficient of thermal expansion of high density polyethylene is positive, linear, and predictable. However, in the temperature range from 140–180° F., the material expands non-linearly and exhibits a tendency toward distortion and shrinkage.

In the case of a snap-on lid having a circumferential flange, this effect would lead to an undesirable shrinkage of the inside diameter of the circumferential flange. This shrinkage destroys the snap-on fit of the lid with the container required to ensure a liquid-tight seal.

It has been found that this shrinkage effect can be compensated for by the inclusion of one or more indented portions 26 on the inner face of the outer skirt 24 of the lid 20. These indented rings provide greater inner surface area for axial expansion of the flange skin which will compensate for radial contraction of the intermediate portions of the lid. Also, the indentations impart added resiliency to the outer skirt 24, thereby compensating for any slight shrinkage in the inner diameter of the lid. Thus, the lid may be sterilized repeatedly for use and may be sterilized either on or off the container without affecting the improved snap-on feature.

In addition to the liquid-tight position discussed above, a loose or loose-fitting position of the lid 20 on the container 12 is provided by the catch bubbles 27 located at axially lower extremities of the inner face of the outer skirt 24.

In the preferred use of the improved lid, a sterile container is first filled with formula and hermetically sealed. The lid 20 with inserted nipple 16 is placed over the closed container with catch bubbles 27 being just below container lip and the locking bead 25 riding atop the lip 15. In this position, the catch bubbles 27 merely serve to retain the lid in a loose manner on the container. Next, the container, lid, and nipple are sterilized together in an autoclave; and, finally, the combination article 10 is packaged in a sterile, hermetically-sealed plastic bag ready for sale. The purchaser simply removes the article from the bag, slips off the lid with inserted nipple, opens the container, and snaps the lid over the container in the

liquid-tight position, thereby rendering the nursing article ready for use.

The liquid-tight fit of the snap-on lid with the container is, in large measure, created by the spring action of the radially outer recessed nave portion 28. This nave portion acts as a circumferential spring means about the fulcrum shoulder 31 to compressively urge inner skirt 23 of the flange 21 into fluid-tight engagement with the container lip 15 and adjacent portions of inner surface 13 of the container.

The two recessed lid portions, the radially outer 28 and the radially inner 34, also function as embossed reinforcement ribs and serve to impart added rigidity to the lid, thereby permitting the use of thin gauge material in the manufacture of the lid.

As has been described, the combination article 10 is well adapted for use with pre-mixed baby formula packaged in standard disposable containers. This pre-mixed product could be marketed in chain stores or pharmacies; and the container, lid, and nipple could be wrapped, either integrally or separately, in a sterile package.

While a preferred form of the invention has been shown and described, it will be apparent that modifications therein could be made without departure from the true spirit of the invention. Accordingly, the scope of the invention is to be measured solely by the scope of the appended claims.

What is claimed is:

1. In combination a snap-on lid and nipple for baby food containers, said lid comprising a disc-shaped lid body provided with a centrally located aperture, said aperture receiving a nipple having an annular groove and a bottom flange, a curved hoop-like flange surrounding said aperture and a first recessed portion joined to the hook-like flange, said recessed portion having an inner surface spaced axially from the hoop-like flange, said curved hoop-like portion contacting the upper portion of the nipple groove and said recessed portion contacting the flange portion of the nipple to uniformly distend and slightly stretch the nipple to provide a fluid tight seal between the lid and nipple, said lid having an intermediate flat portion extending radially outwardly from the first recess and a second recess joined to the outer peripheral edge of the intermediate flat portion, and a cylindrical second flange positioned coaxially and radially outwardly of the second recess and located at the radially outer extremities of said lid body, said second flange being formed of joined radially inner and radially outer skirts, said inner skirt adjoining the inner surface of the container lip and said outer skirt having a radially inner face carrying an inwardly directed circumferential locking bead.

2. The structure of claim 1 wherein the lid is of thermoplastic having the properties of high density polyethylene of specific gravity of about 0.941–0.96, and wherein the inner face of the second flange outer skirt is provided with at least one indented ring located axially below the locking bead to compensate for expansion and contraction of the lid during heating in the range of above 140–180° F.

3. The structure of claim 1 including a plurality of spaced inwardly directed catch bubbles positioned on the inner surface of the outer skirt to define an annular space between the catch bubbles and the locking bead for loosely retaining the lid on a container.

4. In combination a snap-on lid and nipple for baby food containers, said lid having the properties of high density polyethylene of specific gravity of about 0.941–0.96 and comprising a disc-shaped lid body provided with a centrally located aperture, said aperture receiving a nipple having an annular groove and a bottom flange, a curved hoop-like flange surrounding said aperture and a first recessed portion joined to the hoop-like flange, said recessed portion having an inner surface spaced axially from the hoop-like flange, said curved hoop-like portion contacting the upper portion of the nipple groove and said

5

recess portion contacting the flange portion of the nipple to uniformly distend and slightly stretch the nipple to provide a fluid tight seal between the lid and nipple, said lid having an intermediate flat portion extending radially outwardly from the first recess, and a second recess joined to the outer peripheral edge of the intermediate flat portion, a cylindrical second flange positioned coaxially and radially outwardly of the second recess and located at the radially outer extremities of said lid body, said second flange being formed of joined radially inner and radially outer skirts, said inner skirt being a vertical wall defining the outermost edge of the second recess and adjoining the inner surface of the container lip, said outer skirt having a radially inner face carrying an inwardly directed circumferential locking bead, at least one indent ring located axially below the locking bead to compensate for expansion and contraction of the lid during heating in the range of above 140–180° F., and a plurality of spaced inwardly directed catch bubbles positioned on the inner surface of the outer skirt to define an annular space between the catch bubbles and the locking bead for loosely retaining the lid on a container.

5. In combination, a snap-on lid and nipple for baby food containers, said lid comprising a disc-shaped lid body provided with a centrally located aperture, said aperture receiving a nipple having an annular groove and a bottom flange, a curved hoop-like flange surrounding said aperture, and a recessed portion joined to the hoop-like flange, said recessed portion having an inner surface spaced axi-

6

ally from the hoop-like flange, said curved hoop-like portion contacting the upper portion of the nipple groove and said recessed portion contacting the flange portion of the nipple to uniformly distend and slightly stretch the nipple to provide a fluid tight seal between the lid and nipple, said lid having an intermediate flat portion extending radially outwardly from the first recess, a cylindrical second flange positioned coaxially and radially outward of the intermediate flat portion and located at the radial outer extremities of said lid body, said second flange being formed by radially inner and radially outer skirts, said inner skirt adjoining the inner surface of the container lip and said outer skirt having a radially inner face carrying an inwardly directed circumferential locking bead and a plurality of spaced, inwardly directed catch bubbles positioned on the inner surface of the outer skirt to define an annular space between the catch bubbles and the locking bead for loosely retaining the lid on a container.

## References Cited by the Examiner

## UNITED STATES PATENTS

2,558,195	6/51	Pearl	215—
2,796,062	6/57	Tupper	128—2
2,802,609	8/57	Donovan	222—5
3,076,574	2/63	Woodbury	215—

FRANKLIN T. GARRETT, *Primary Examiner*.EARLE J. DRUMMOND, *Examiner*.